JUN 29 1943

Gas Journal

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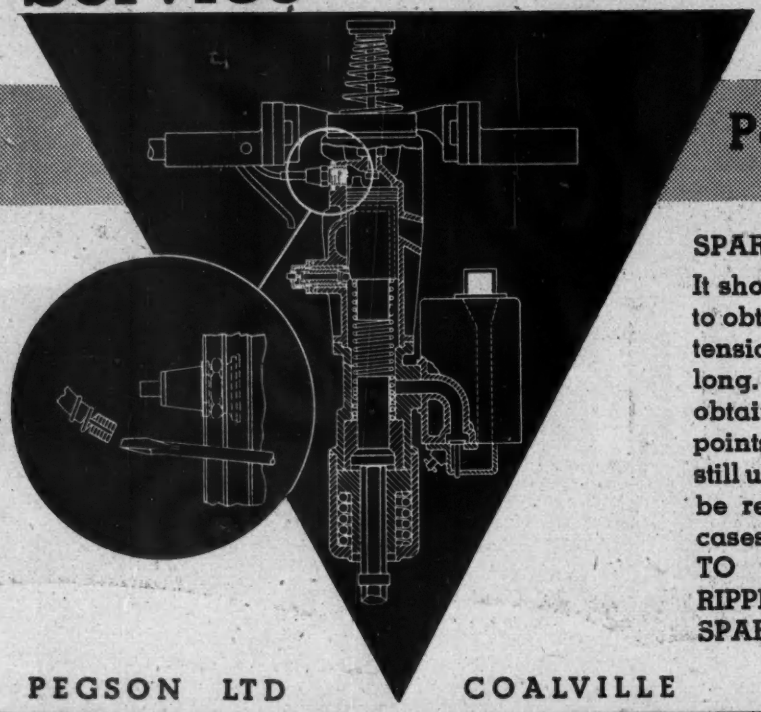

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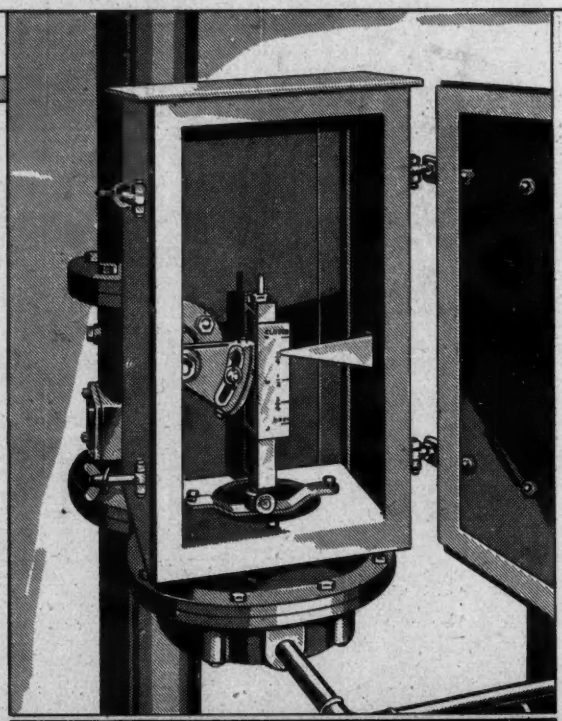

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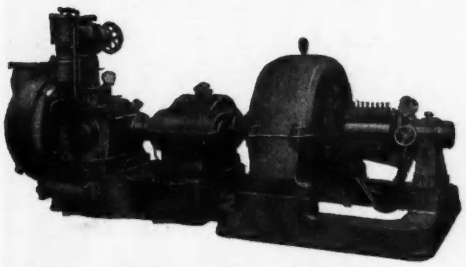

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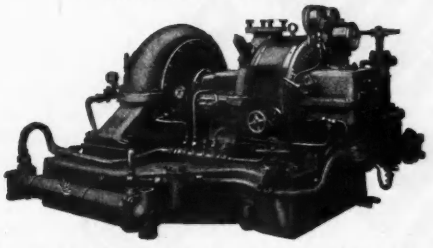

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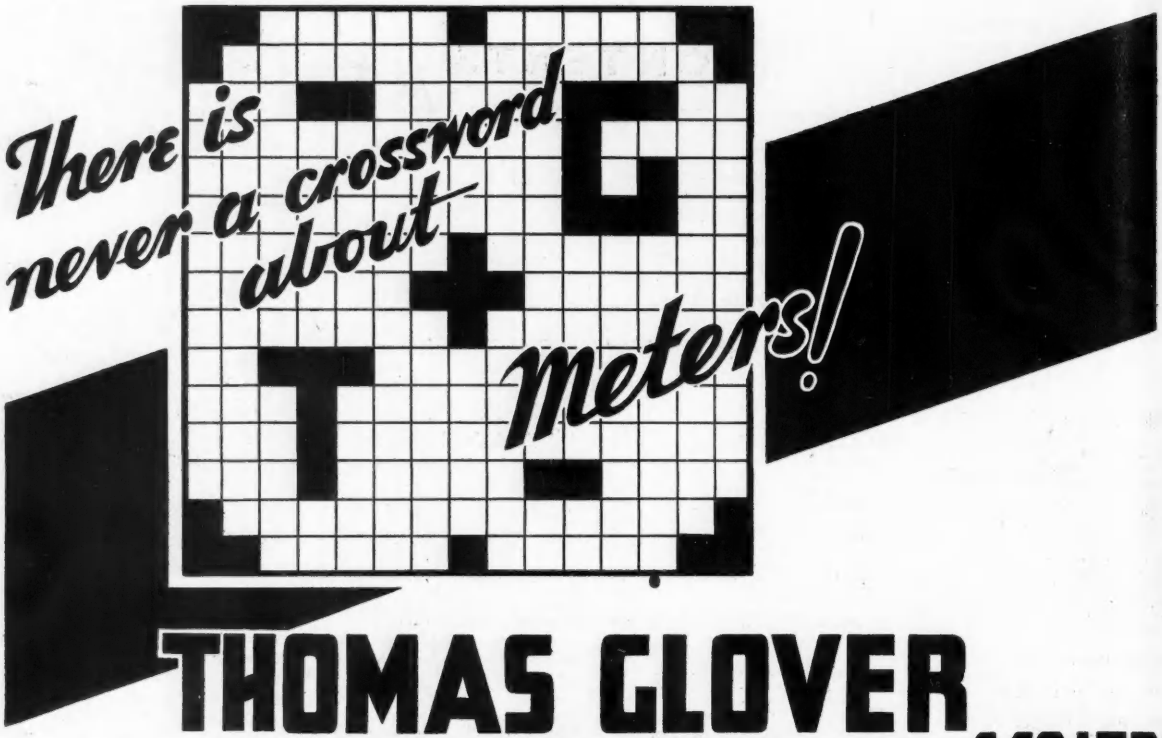

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P.8

GAS JOURNAL, MAY 12, 1943

VOL. 241 95th YEAR No. 4173

EDITORIAL NOTES

THE MAGIC OF INFRA-RED

NO doubt many will have noted the prominence which has been given of late in the electrical Press and other journals of a more general engineering nature to the application of infra-red electric lamp heating to industrial purposes. To the general reader unversed in the use of radiant heat and aware only very vaguely about its properties, this electric " infra-red " performance may appear startlingly and refreshingly new, unlocking the door to novel and extensive fields; and we think that it would perhaps be salutary, even at a time of "truce" and "understanding" between gas and electricity, to bring the matter into some sort of perspective. For, after all, infra-red heating, studied intensively over many years by the Gas Industry, and notably by Radiation Limited, whose published work on the subject is well known and is available to all, is radiant heating in a defined wavelength range. In electrical application radiant heating has been limited to a range of infra-red rays emitted by the tungsten filament lamp which fall in a comparatively narrow range of the radiant heat spectra. At this stage in the march of scientific development there is no need for woolly thinking about the matter. There is nothing unique in the properties of the infra-red rays generated by electrical means, nor is there anything revolutionary about the application of radiant heat.

At a recent meeting of the Institution of Electrical Engineers many claims were made for infra-red heating for industrial purposes—as though we were starting *de novo*. The principal advantage, we were told, is that the heat is transferred directly from the source of energy to the object to be heated, without raising the temperature of the intervening atmosphere—an advantage hardly foreign to the application of radiant heat produced by the burning of gas. It was explained, too, that, by using electrical infra-red instead of convective heat, the time taken for the low-temperature stoving of enamels could be reduced by 90%. This as one example. But surely it is only a matter of radiant heating, the application of which, both for domestic purposes and for industrial processes, has for years been common practice in the Gas Industry—domestically, for instance, in the toasting of bread or the grilling of meat; industrially in the drying of printing inks, paints, or furs. In the available radiant heat sources the Industry has the experience of many years of research and many years of practical application; it has available both high-temperature and medium-temperature sources of radiant heat which are of the simplest form of construction, are robust, require little maintenance, have long operating life, give uniform radiation without recourse to reflectors, have low initial cost, and require no special installation features. Without going into technical detail, we would mention as a significant fact that high-temperature gas-heated panels give a flux density of an order ten times as high as that given by the tungsten filament lamp.

Last week we were glad to avail ourselves of the opportunity of seeing developments at first hand in the Watson House Laboratories of the Gas Light and Coke Company—special heaters for many industrial purposes, among them the curing of heat transformable paints used for protecting sheet metal objects. By the equipment developed, paints requiring 30 minutes at 250°F. in a convector oven can be dried in about half-a-minute by radiant heat—or, if you prefer, by the magic infra-red. And the air temperature in the equipment is only 15°C. higher than atmospheric. This, of course, is only an example of many applications, to some of which in any case we should not be allowed to give publication in wartime, though, through the appropriate channels, the information would be available to anyone engaged on essential work. Research by the Gas Industry to aid the war effort has been by no means lacking, and we should like to emphasize that the results of this research are freely available. There are no patents, no registered designs, on these new developments. The Gas Light and Coke Company is prepared to give full information to recognized industrial oven builders, to the manufacturers of industrial equipment generally, to paint manufacturers, in furtherance of the war effort through the medium of "infra-red." We hope later to refer to the matter more specifically.

COKE ORGANIZATION

LAST week we commented on the Address given by Dr. Harold Hartley to the Eastern District of the Southern Association, giving prominence to his considered view that the future of gas depends on its alliance with coke, that gas in the post-war period must rely on coke more than ever before, that the success of gas will depend on the ability of the Gas Industry to popularize and supply a graded coke of reasonably constant quality. We publish the Address in the "JOURNAL" to-day, from which it will be seen that thermal efficiencies of coke-burning appliances ranging from 33% to 80% are visualized. The day prior to the Southern meeting we attended the annual meeting of the Midland Counties Coke Association and we found the speech of the Chairman, Mr. A. W. Smith, very encouraging, and essentially what we may term "sound." A substantial summary of what he had to say also appears on later pages of to-day's issue. As the basis of the opinions he expressed in dealing with the Association's work was his contention—and we feel it is a "sound" contention—that solid fuel, even in the domestic market, has by no means had its day, and that the properties of coke as a smokeless fuel fit it admirably for a place in the plans already under way for rebuilding Britain.

That the Association has admirably carried out work of importance is obvious, and it is clear, too, that war difficulties have strengthened its position rather than otherwise and have widened its scope. Contact of a most useful and practical nature has been established with the hard coke and anthracite interests through the National Policy Committee, and on the proposal of the Association a committee has been set up composed of the secretaries of each district coke association. Through this contact it is likely that the needs of the district will become more apparent, and that as a result of this informal work the National Federation of Gas Coke Associations will be further stabilized as a united and truly national body.

Of course, Birmingham knows something about coke preparation and marketing. The Birmingham Gas Undertaking was

early in the field at the beginning of the present century producing coke of a quality and size specially adapted to the purposes for which it was sold. At the Association's meeting Mr. Smith mentioned that even now there are consumers in distant parts of the country who insist upon asking for Birmingham coke, and are willing to pay a higher price for it, although their local undertaking may long since have followed suit and offered graded coke of, as far as possible, constant quality. The Association's policy is that local coke, whenever it fulfils the necessary requirements, should have first chance; and in this direction the Association is active. At present Government departments prefer to place their contracts with factors rather than with gas undertakings; unfortunately, explained Mr. Smith, some of these factors do not seem to be aware of the existence of provincial gas undertakings other than the larger ones. Here the Association can step in to see that this lack of knowledge does not act to the detriment of any member, but—and this is all-important, the suitability of the coke and guaranteed continuity of supply are essential before the claims of a local undertaking can be satisfied.

Looking to the future in a general way Mr. Smith was quite optimistic of results provided efforts are continued and increased to improve coke preparation and marketing—improvement through organization allied to individual effort and individual enthusiasm. Quality and correct sizing are foundation stones, but the battle, he emphasized, will not end with quality and sizing. There must be commercial as well as technical development. Contact with appliance manufacturers, heating and ventilating engineers, builders, architects, and so on, is essential. So is the development of local markets; so is exploration of new markets. It is gratifying, therefore, that the whole subject of the technical and commercial development of coke on a national basis is about to be considered by the National Federation. Discussions are in their earliest stages, but, said Mr. Smith—and his remarks are a source of encouragement—"if all goes well I am hopeful that the result will not be a mere exhortation to make better coke and put more energy into selling it, but that a really practical scheme will be evolved which, provided it gets the full support of every undertaking, will help coke to take its rightful place in the post-war world." Once again we would emphasize the need for individual effort to translate into practice the potential value of coke to the Gas Industry—a potential value which it is difficult to over-estimate.

"NEAT" GAS

MR. DEAN CHANDLER'S suggestion last week of the epithet "neat" for describing gas burned without primary aeration has naturally brought comment. It has even inspired one writer to verse, but unfortunately we cannot publish his effort as our poetry editor assures us his lines do not scan. It is agreed that "luminous" is not an accurate description in these days, and that "non-primary-aerated" is cumbersome, and that either term would in any case be puzzling to the non-technical public. But common to almost all the correspondence which has reached us on the subject is some allusion or other to the consumption of alcoholic beverages without aqueous dilution; and if this is the suggestion which "neat" immediately makes to the ordinary mind, it would be unfortunate to offer a second gift to the music hall comedian when even to him the stock of therm jokes is beginning to look shabby. Taking the more sober view, we ourselves associate "neat" rather with natty trousering or other items of apparel (doubtless from our long association with gatherings of gas engineers in the Metropolis and elsewhere), hard as we tried last week to clothe the useful little word with dignity by digging out for it an elegant dictionary definition. It would appear, therefore, that this question of nomenclature merits further thought; the importance of naming anything correctly the first time is so well known—especially to those who have spent their lives in the advertising world. "A rose by any other name . . ."; but that is a dangerous line of thought where gas is concerned. And we would mention that a correspondent is afraid that the public might dangerously associate the idea of using gas "neat" with extravagance, which to our mind is not at all far-fetched.

Yes, indeed, there is room for much thought before we attempt to settle the "luminous" flame with any popular name. Do we, for one thing, wish to confuse the public mind at all with the merits or otherwise of various flame structures? Must we not beware of implying that any appliance which does not work with this "new" (150-year-old) flame is out of date? As we pointed out last week, we think the bunsen burner still has a great many functions to perform in the service of gas, greatly as we welcome research on its resuscitated predecessor. At the same time we heartily commend Mr. Dean Chandler for raising the question of a name and for initiating thought on the matter. If it is to be a name for our own use as technicians, then "luminous" would seem to serve as well as any. If we are to launch one on the public, great care will be needed in its selection.

Junior Recognition

Following a majority decision of the Council of the British Joint Junior Gas Association, the members of the various junior associations are being asked at their general meetings to confirm this majority decision—which is to seek direct affiliation with The Institution of Gas Engineers through representation on the Institution Council. For years, of course, the Juniors have had what may be termed "indirect" affiliation through their respective Senior organizations, on whose councils each junior association has had representation, through its president and secretary for the time being, so that no charge can be made of lack of practical channels of approach by the Juniors to the parent technical body of the Industry. The new move—and it has, we believe, the full sympathy of the Institution, is designed so that the Council of the British Juniors shall be able to elect one member (who, understandably enough, must himself be a corporate member of the Institution) to represent all the Juniors on the Institution Council and, presumably, act as effective mouthpiece for them. With this desire, bearing in mind the large aggregate membership of the junior associations, there should be general agreement, and it is being expressed appropriately at a time of growing appreciation of the need for encouraging the younger members of the Industry to play a vigorous part in the Industry's activities, and to join in a practical way in formulating its plans for the future.

Personal

Mr. FRANK PLATT, C.C., Manager and Secretary of the Hayfield Gas Company, has been appointed a magistrate for the County of Derby.

* * *

Mr. R. J. BRADSHAW, Engineer and Manager of the Bridgnorth Gas Department, has been appointed Deputy Engineer and Manager to the Corporation Gas Department, St. Helens, and will shortly take up his new duties. Mr. Bradshaw was formerly Assistant Engineer at Macclesfield, Rochdale, and Bath.

Obituary

C. G. Langford

Very suddenly at his home at Esher, Surrey, CECIL G. LANGFORD died on May 6, in his 56th year.

Mr. Langford was a Director and the General Manager of Richmonds Gas Stove Co., Ltd. (Radiation Ltd.), and Managing Director of George Glover & Co., Ltd. He began his career in the Gas Industry as an articled pupil to the Engineer of the Coventry Gas Undertaking, and in 1911 went to Brazil to the Para Gas-Works, of which undertaking he became Engineer and Manager. Returning to England at the beginning of the Great War, he was from 1915 to 1919 General Manager of a Government filling factory in Middlesex. In July, 1919, he was appointed Works Manager of the Warrington Works of Richmonds. In August, 1930, he became Commercial Manager of George Glover, Chelsea, and was appointed General Manager in 1931, joining the Board in 1937, and becoming Managing Director in 1939. In the same year he joined the Board of Richmonds.

Mr. Langford was a member of The Institution of Gas Engineers and the Institution of Mechanical Engineers. He was Vice-Chairman

of the Society of British Gas Industries, and was nominated to be the Chairman for election in June. He was a member of the Council of the British Gas Federation, and a member of the B.C.G.A. Executive Committee and of its General Committee. He served on The Institution of Gas Engineers Advisory Committee on Research and on the I.G.E. Meters Committee. He was a member of the Gas Industry Committee of the British Standards Institution. He was also a member of the Grand Council and of the Executive Committee of the Federation of British Industries, and Vice-President of the Engineering and Allied Employers London and District Association. He served on the Regional Board of the London and S.E. Region until last year.

This bare recital conveys the impression of very many activities on behalf of the Gas Industry, but it can give no idea of the quiet and unassuming way in which Cecil Langford performed any task which came his way, which made him loved by all with whom he came into contact, which carried conviction for the sound and far-seeing views he held on a great variety of matters. Like his brother Leonard, who died only last November, Cecil succeeded in extracting from life every scrap of happiness, and his great joy was to share it with everybody around him. I can testify that he was full of his usual exuberant spirits as we pedalled along together only the Saturday before his death to resume a pre-war series of many happy golf contests. This must be my excuse, if one be needed, for this unusual incursion into the personal sphere. He will be greatly missed both in private life and in business, where he had much useful work still to do for our Industry. The sympathy of all will be extended to his widow and son and daughter—the son on service in the Middle East. And particularly within the Industry to Percy Langford, who has lost so suddenly two members of a wonderful triumvirate. Only those who were privileged to meet the three brothers together in private life could realize how wonderful a one it was. W. R. K.

* * *

The death has occurred of Mr. J. E. HORSFALL, Director of Robert Dempster & Sons, Ltd., Elland. Mr. Horsfall's services with the firm extended over a period of 57 years, and for over 40 years he was Chief Draughtsman, relinquishing that post in September, 1942, when Mr. Edward Whittaker was appointed his successor.

Letter to the Editor

Co-Partnership

DEAR SIR,—In your issue of May 5 appears an article by "Futurist." I do not know who this gentleman is, nor do I know what his experience may be, but I desire to refer to his remarks on co-partnership (see p. 558). He states that this is "a system rejected as a failure by nearly all other industries." It is of course a system which for certain obvious reasons cannot be made applicable in certain cases, but in many other industries where it has been brought into operation it is most certainly not a failure.

But in the next sentence the writer makes a statement which is quite untrue when he says that "the value of co-partnership as an incentive is *nil*." Further, "the rewards are not sufficiently tangible." These statements I would emphatically deny from my own experience in several undertakings. Where a contributory pension scheme is allied with a co-partnership scheme under which part at least of the bonus is applied to provide the pension contribution there is a tangible and appreciated result and the opportunity to invest is regarded with pleasure, as is evidenced by the substantial holdings in the undertakings concerned.

But these advantages, when coupled with the true co-partnership spirit produced when the scheme is explained and grasped by the workpeople, brings an *esprit de corps* which is most remarkable.

The pride in the company and the genuine enthusiasm to render to the consumer the best and most efficient service possible is a fact that cannot be denied, while a team spirit is also evoked of the highest value.

A co-partnership committee is the best way to contact the employees and get to know their views and troubles face to face and to overcome such difficulties.

I hope most sincerely that "Futurist" may become a "questioner," and not in future make statements which are contrary to facts in the Gas Industry.

48, *Copthall Avenue*, *London, E.C.* 2. *May* 10, 1943.

Yours faithfully,
WM. CASH.

University of Leeds

The exigencies of the war have had one important influence on the life of all British Universities in that the Government now requires that a normal three-year Degree Course must be compressed into two years and three months. This has caused the advancement of certain examinations leading to the publication of the following results:

Gas Engineering—Honours, First Class:

F. C. WOOD—for a thesis on "The Organic Sulphur Compounds in Producer Gas and their Removal."

D. HEBDEN—for a thesis on "The Catalytic Synthesis of Methane from Carbon Monoxide and Hydrogen as a Means of Gas Enrichment."

Mr. Wood is the present holder of the Corbet Woodall Scholarship.

The Junior Associations

London

The London and Southern District Junior Gas Association met for their annual meeting on April 30 at Gas Industry House, with Mr. G. Dougill presiding. Mr. Dougill briefly reviewed the activities of the Association during the session, mentioning that the membership now stood at 495. He also referred to the decision taken by the Joint Council of the British Junior Gas Association to seek affiliation with The Institution of Gas Engineers, which affiliation, if carried through, would give the Juniors a member to represent them on the Institution's Council. All the Junior Associations, he said, had agreed to this idea, with one exception.

There followed election of officers for 1943-44:

President—B. W. Dawkins.
Senior Vice-President—R. F. Twist.
Junior Vice-President—L. W. Andrew.
Hon. Secretary—C. A. Deas.
Asst. Hon. Secretary—J. E. Gray.
Hon. Auditor—G. W. Smith.
Hon. Treasurer—S. J. Gibbons.
Council—D. R. Clark, F. H. Cope, J. E. Gray, T. S. Ricketts.
I.G.E. District Education Committee—T. H. Prater (Hon. Secretary), B. W. Dawkins, R. F. Twist, C. A. Deas, G. G. Warne.

Midland

The annual meeting of the Midland Junior Gas Association was held in Birmingham on April 29, Mr. W. N. Smirles (Birmingham) in the Chair.

Owing to wartime restrictions the report and accounts were not printed. The Chairman, reporting upon the year's work, said during the session now ending seven general meetings and eight council meetings had been held. The President and Secretary had attended two meetings of the Joint Council of Junior Gas Associations at which it was decided to seek affiliation with The Institution of Gas Engineers, and negotiations on the matter were in progress. The matter would be discussed subsequently.

New officers were then announced:

Junior Vice-President—K. L. Pearce (Bilston).
Secretary—A. Hill.
Treasurer—G. W. Smith.
Council—C. L. Evans (Birmingham), G. E. Burden (Redditch), F. N. Tidball (Cannock).
Education Representatives—F. A. C. Pykett (Coventry), F. L. Atkin (Birmingham).

Mr. G. E. Stevenson (Long Eaton) was inducted as the new President. On his proposition a cordial vote of thanks was accorded Mr. Smirles (the retiring President), who had carried out his duties in a most efficient manner under very difficult conditions.

Mr. Stevenson then gave his Address.

Mr. F. J. Bengough (Birmingham) proposed a vote of thanks to the President, and Mr. K. L. Pearce seconded.

Western

The Western Junior Gas Association met at Weston-super-Mare on May 1—actually the first annual general meeting since April, 1940. In its report the Council stated that it has continued to meet from time to time during the past three years, and the British Junior Gas Association Joint Council has met twice since last September. Most of these meetings have been concerned with improvements to the status of the Junior movement and in securing better national representation. It has been decided that the Joint Council shall become more active, and that an Executive Committee to be formed within it and representative of all the Associations shall meet quarterly; also that the Joint Council shall seek affiliation with The Institution of Gas Engineers. This will give the Junior movement a member on the Council of the Institution. The Western Junior Association is now permitted to send three of its members to all meetings of the Southern Association. Application has also been made, through the Secretary of the District Post-War Planning Committee, for representation on that body.

Scottish Eastern

The Scottish Junior Gas Association (Eastern District) met in Edinburgh on April 17, when Mr. F. Brinsley, Technical Service Manager of Radiation Ltd., gave an Address on "Experiences of a Roving Technician."

Diary

May 15.—Manchester and District Junior Gas Association, Rochdale Road Works, Manchester, 2 p.m. Paper by J. C. Hogg (Stretford) on the "Treatment of Ammoniacal Liquor on a New Works."

May 17.—Gas Companies' Protection Association, Executive Committee, 5, Victoria Street, 2.30 p.m.

May 20.—Institute of Fuel, Institution of Mechanical Engineers, S.W. 1, 5.30 p.m. Paper by O. W. Roskill, "Statistics in the Fuel and Power Industries."

May 26.—B.C.G.A.—Executive Committee, Gas Industry House, 2 p.m.

June 9.—Institution of Gas Engineers, Annual General Meeting, London.

MIDLAND COUNTIES COKE ASSOCIATION

The Annual General Meeting of the Association was held in Birmingham on April 29, the Chair being taken by Mr. A. W. Smith (Birmingham Gas Department), who gave a detailed report of the Association's activities during 1942. He said the Committee had endeavoured to watch the interests of gas coke in all directions, and mentioned the Association's good relationship with officials of the Ministry of Fuel and Power, which had enabled the Secretary to deal satisfactorily with many matters on behalf of individual members.

Mr. Smith then dealt with the subject of coke prices in the Midland area, their present level and future possibilities; also with the question of merchants' margins, and a plan at present under review in this connexion. On the subject of coke supplies Mr. Smith said: "Production has continued to increase, but the heavy demands from Industry and Government Departments has absorbed it. In general, supplies were easier than in the previous year, due to a large extent to the exceptionally mild weather and to the fuel economy campaign, which greatly reduced domestic consumption.

"Fuel rationing, which seemed a possibility this time last year, has been avoided, but restriction of supplies of solid fuel to controlled premises has continued, varying month by month. Most of us feel that the supply position has not warranted restriction of coke, and we have found it irksome, to say the least. Repeated requests have been made to the Ministry for the restrictions to be lifted, but though they have eased them very considerably they cannot agree to abolish them entirely. No doubt the Government attitude is based on higher policy and anticipation of contingencies which may arise at any time now. In that case we must persuade ourselves that their policy of conservation of supplies is in the true interests of the war effort.

"Many of us have been seriously embarrassed during the year by accumulating stocks of unscreened breeze, for which it has been very difficult to find an outlet. The whole subject of the disposal of breeze, and possibly the price, is under discussion by the National Federation. They have rightly started by agreeing a standard definition, so that we all know what we mean by the term 'unscreened breeze.' Members of this Association have already been advised that it is defined as material below ¾ in. from which no fines have been removed. An endeavour is being made to find out the uses to which breeze is put in various parts of the country, with the object of pooling this information. There is also a suggestion that something in the nature of a District minimum price should be agreed upon, again having in mind national contingencies which might call for the use of every available type of fuel, even unscreened breeze.

"You all know that the Government have taken steps to cut rail haulage down to a minimum, and the movement of coke by rail for Government contracts has therefore come, to some extent, under the control of the Coke Supplies Officer. It is his job to see that the coke is drawn from the nearest suitable source of supply, but an arrangement has been made for the detailed work in connexion with Midland gas coke to be done by this Association. So far this arrangement is working well, and we are very satisfied, as a District, with the consideration we receive from the Coke Supplies Officer.

"It is this Association's policy that local coke, whenever it is a reasonable proposition, should receive first consideration, and already a number of you have had first-hand evidence of this. It is a fact that Government departments prefer to place their contracts with factors rather than with gas undertakings—and no doubt they have their reasons for doing so. Unfortunately some of the 'chosen few' factors do not seem to know of the existence of provincial gas undertakings other than the larger ones, and the Association is endeavouring to see that this lack of knowledge shall not act to the detriment of any member. It must always be borne in mind, however, that the suitability of the coke, and, still more important, guaranteed continuity of supply, are essential before the claims of a local undertaking can be considered."

Mr. Smith paid tribute to the valuable work of the National Federation of Gas Coke Associations, mentioning in particular the contact which had been established with the Hard Coke and Anthracite interests through a National Policy Committee. From this contact had arisen the tri-partite Technical Committee, one example of whose valuable work was the booklet on *Producer Gas Plant for Industrial Purposes*. He also mentioned that, on the proposal of the Midland Association, a Committee had recently been set up composed of the Secretaries of each District Coke Association, and it was hoped that through this informal contact the divergencies in the make-up, problems and needs of each district would come to the surface, which would help the Federation to remain a united and truly national body.

The Association's co-operation with hard coke interests, said Mr. Smith, had been extended to embrace the North Staffordshire producers, who had now formed their own Association.

Membership of the Association's Distributors' Branch was well over 2,000. He urged members to encourage their merchant-customers to look to the Branch for help on all matters connected with coke, as the establishment now of a feeling of reliance on the Association would be repaid over and over again after the war when that confidence and dependence would be essential to ensure the maintenance of price control.

Mr. Smith then spoke on the future development of the gas coke market, and said: "It is a happy reflection of the present 'feeling in the air' that many of my earlier remarks have a bearing not only on the year under review but on the future. We do not know how far ahead peace lies, but we do know that when it comes it will bring the need for vigorous efforts by the Gas Industry if coke is to take its proper place in the post-war world, and I do not think we can afford to wait until peacetime conditions are upon us before shaping our policy for the future development of coke.

"In spite of the expectations of the 'total gasification school,' the Gas Industry for many years to come will be producing coke, and we shall have to sweep out of our minds the old conception of coke as a waste product, a nuisance, an unwanted but inescapable result of gas production, which was certainly in the minds of gas engineers of the past, and, I am afraid, in the minds of some gas engineers of the present day. We have got to bring it out of the corner into which it has been elbowed and let it take its rightful place side by side with gas, as a lesser but nevertheless a valuable product, and a self-respecting source of revenue, worthy of a fairer proportion of the consideration which is devoted to our main product.

"Solid fuel, even in the domestic market, has by no means had its day, and the property of coke as a smokeless solid fuel fits it admirably for a place in the plans already under way for rebuilding Britain. Let us admit, then, that coke has a *potential* value to the Industry which it is not easy to over-estimate. At the same time let us recognize that if, through lack of preparation, this potential market is lost to competitive fuels, gas coke may suffer a blow from which it would not speedily recover. During the war coke is not difficult to sell, but when the present abnormal demand decreases greater feats of salesmanship are going to be required. Moreover, other fuels will be better organized than ever before and we shall have to meet severe competition. Coal, anthracite, and hard coke are already equipping themselves for the post-war struggle, and gas coke must do the same.

"Quality and correct sizing are the foundation-stones. Your attention has already been drawn to Part I of the Report of The Institution of Gas Engineers' Committee of Enquiry on Coke Quality, which deals with sizing. I strongly recommend you to keep the recommendations of this report well in mind so that the possibility of putting them into operation (where this has not already been done) can be considered as soon as the necessary changes are feasible. I can support the recommendations from experience. Birmingham was the first gas undertaking in the country to begin producing, over 40 years ago, coke of a quality and size specially adapted to the purposes for which it was sold, and even now there are consumers in distant parts of the country who insist upon asking for Birmingham coke—and are willing to pay a higher price for it—although their local undertaking may long since have followed suit and sized its coke.

"But the battle will not end with quality and sizing. Coke will still have to be sold, and there must be commercial as well as technical development. The Gas Research Board is already dealing with the technical side, and I think it is the business of the National Federation of Gas Coke Associations to see that the results of this research are not minimized by insufficient attention to the commercial aspect. Coke of correct quality and size loses its value, for instance, if the appliance in which it is burned is not suitable. Contact with appliance manufacturers, heating and ventilating engineers, builders, architects, &c., is therefore essential. So is the development to their fullest extent of local markets, and the exploration of new markets. In these connexions the London and Counties Coke Association has done invaluable work in the South over a number of years, and it has proved that coke can be used for purposes which would have seemed at one time unbelievable. There is no reason to suppose that a thorough exploration of districts other than the L.C.C.A. might not bring to light still more new markets.

"The whole subject of the technical and commercial development of coke on a national basis is about to be considered by the National Federation. Discussions are in their very earliest stages, but if all goes well I am hopeful that the result will not be a mere exhortation to make better coke and put more energy into selling it, but that a really practical scheme will be evolved which, provided it gets the full support of every undertaking, will help coke to take its rightful place in the post-war world."

Mr. Smith then moved the adoption of the Report and Accounts.

Mr. F. C. Briggs, in seconding this, said he thought everyone would be satisfied with the year's work. He emphasized Mr. Smith's remarks on the future development of the gas coke market, and the greater consideration which must be given to coke by the Gas Industry.

Before the meeting closed a resolution was passed that a reserve fund should be built up to help finance post-war efforts in this connexion.

Burnley Corporation, on April 29, decided to set up a special committee to report on co-ordinating control and administration of the Gas and Electricity Undertakings by the appointment of a Power and Light Committee. The Committee will have three independent Councillors, the Chairman and Vice-Chairman of the Gas and Electricity Committees, with a member of the Labour Party from each Committee.

WHAT OF THE FUTURE IN THE DOMESTIC FIELD?*

By Dr. HAROLD HARTLEY

"STRIKING advances are open for both gas and electricity as the servants of industry, agriculture, and in the cottage home." This sentence is taken from the speech broadcast by the Prime Minister on Sunday, March 21, 1943.

After the war the people of the country will expect, and should be provided with, much improved living conditions as compared with those available to them prior to 1940. To me it is unthinkable that there should be a continuation of the conditions as shown to exist by Margery S. Rice in her book, *Working Class Wives*. The experiences of evacuees—both parents and children—of better living conditions and facilities, factory welfare for juveniles and for many women who previously had neither had experience of factory life, nor knowledge as to how easily good living conditions could be attained, together with the continued education of the younger generation, will inculcate a desire for much better facilities. If the present temper of the people persists and is not swamped by the very natural desire for immediate reunion with their menfolk in their old districts, the clearing of the slums of our cities will be continued rapidly. We are told that 4 million new homes are needed, and surveys suggest that some 90% of the people want houses rather than flats. It will be expected that in these homes there will be modern conveniences which were not available to the very poorest in the decade that has passed, and especially will they expect improvement in the kitchen equipment, in the hot water supply, and by way of provision of bathrooms and general washing facilities. The expenditure necessary in the past to obtain an adequate heat service in the home has been so great with the equipment provided as to be beyond the reach of those in the lowest income range, and, for most "industrial" families, has represented an appreciable proportion of the available earnings. Developments in domestic goods which result in a lightening of this burden are of very real service to the nation.

Dr. le Diamond has estimated that there are approximately 10¾ million domestic consumers of gas, and that in pre-war days nearly three-quarters of these had a gross income of under £4 per week. It is especially with this major section of the community that the Gas Industry must concern itself ; it is they whom we must serve, whether we continue to operate as individualists or under some form of State control—as seems to have been suggested by the Prime Minister in his latest broadcast. While we are not in a position to estimate what will be the actual costs in the post-war period, it is perhaps unlikely that there will be any material change in the relative cost of the supply of the various fuels, although there will be some change in the relative cost involved in obtaining the three heat services from the different "fuels." The three heat services are, of course, space heating, heat for cooking, and for hot water supply.

The function of a house is to provide, primarily, protection from the elements, and then the three heat services. To-day architects seem to be more conscious of the importance of ensuring that the heat services shall be provided effectively and efficiently, and those whose business it will be to see to the provision of new homes after the war are especially anxious to learn what the fuel industries have to offer them.

The cost of using different types of appliances will depend on the basic prices of the various raw fuels. It is important that basic prices are adopted which are sound economically; they should not be artificially bolstered by direct or indirect subsidies in order to obtain some particular load. In other words, uneconomical promotional tariffs should be abolished. Until an agreed basis on this point is reached, no authoritative statement can be made, for conclusions drawn may be considerably modified by modification of the basic charges assumed. Nevertheless, in this survey, for the purpose of comparison and to enable us to review the position, certain pre-war prices will be adopted.

The Gas Industry supplies both gas and coke, and while feeling that if the Gas Industry were big enough it could deal with the whole domestic demand more satisfactorily than either of the other industries, it is recognized that the consumer must have complete freedom of choice of fuel.

It is estimated that immediately prior to the war, some 14–15 thousand-million therms of "fuel" derived from natural sources were used annually in the homes of the people of these islands. Of this some 12 thousand-million were derived from 40 million tons of coal, burned directly by the general public, and of the total domestic need the Gas Industry supplied only some 20% and the electrical industry only about 3%.

Technically, the gas appliance is much ahead of all others. The great success of the Gas Industry in the domestic field, and its increased strength, is in no small measure due to the appliances which have been made available, and especially to the developments which took place in the gas cooker immediately after the last war. To-day the gas appliance industry is even stronger technically than it was in 1918, and I see no reason for despondency in regard to the future.

* Address to the Southern Association of Gas Engineers and Managers (Eastern Section), April 30.

Before the war town gas was used by the majority of families for some purpose or other, and even where the equipment in the house included solid fuel cooking apparatus, a very large number of people used gas for the preparation of meals.

While the ultimate aim of the technician is to develop an all-gas Industry, and this may come to fruition at no very distant date, the extent of the success which will be attained in the immediate post-war period in the service of the poorer section of the community will also depend upon the ability of the Industry to popularize and supply a graded coke of reasonably constant quality. Gas-works' coke is the cheapest domestic fuel available, and with it a higher thermal efficiency is attainable than with a bituminous coal. With a gaseous fuel higher thermal efficiencies are attainable than when solid fuel is used, and in general it should be possible to obtain a higher thermal efficiency of conversion with electricity than with gas. It is for this reason that, on the basis of fuel costs alone, the consumer can afford to pay a higher price per therm or per unit for gas or electricity respectively than for the energy derivable from solid fuel. Gas and electricity are, however, more convenient to handle, and their use results in labour saving, which, unfortunately, in the domestic field cannot readily be translated into pounds, shillings, and pence, but for which all will pay something according to their means. Nevertheless, when we bear in mind that before the war the potential energy available in coal cost the London consumer only about 2d. per therm, and that gas in that area was not obtainable at less than 4d. per them, it will be seen that a considerable margin of advantage was required in the efficiency attainable with a gas appliance to enable price parity for fuel to be attained.

As the development of the energy is more easily controlled with a gas appliance, it should be possible to reduce the amount of wastage, but in general it is found that people tend to use what the apparatus will consume.

I have suggested, admittedly with provocative intent, that the Industry owes a great debt to the appliance manufacturer. Nevertheless, I do want to say in all seriousness that to-day the domestic gas appliance is ahead technically of that offered by either of the competing industries. Real scientific progress in gas appliance design dates from the first decade of the present century, when the Joint Committee of the Institution and the University of Leeds published reports of the work of E. W. Smith on the devising of a method for measuring the radiant efficiency of the gas fire. Since that date appliance makers have equipped themselves with research or development staffs, and the art of appliance design has gone forward by leaps and bounds. We are no longer concerned solely with thermal efficiencies, but investigate all phases of the problems connected with the supply of the heat services to the home. The chemical and physical changes taking place during the cooking of food are examined in detail, and the behaviour of carbohydrates, proteins, and so on, in the gas oven, and under a variety of conditions in the laboratory, are closely watched, and as you know, a great deal of energy and money has been expended in producing reliable instructions for the housewife in the preparation and cooking of food. In a recent remark at a meeting of the Brains Trust, Miss Rebecca West mentioned that one of the things that had impressed her in the period between the two wars was the general improvement in the quality of cooking in English homes. For that improvement the Gas Industry, with its thermostatically-controlled cooker, can claim the credit. It was in 1923 that we introduced the "Regulo," and started a revolution in gas cooker design in this country.

Our study of the gas fire, and, in fact, of all appliances, led me to suggest the adoption of combustion standards. To-day we have them embodied in British Standard Specifications. Neither of the competing industries has done this. The ventilation of the living-room by means of the gas fire was thrashed out a quarter of a century ago, and the views of the Gas Industry have, I believe, carried considerable weight with the officials of the Ministry of Works and Planning.

The radiant efficiency of the gas fire has been increased, and we have done a lot of work in our study of the influence of the wavelength of the infra-red energy on the sensation of comfort.

I had not an opportunity until 1924 to initiate this latter work, but as a result of the painstaking experimental work of our Central Laboratory staff, we have developed further the ideas underlying gas fire design. Technically, the gas fire is now quite a remarkable appliance.

We have in the Industry a very important background of knowledge which is greater than that yet possessed by the makers of solid fuel or electrical appliances. This knowledge should be used, provided we know how to present our matter to the general public.

We are all aware of the advantages which can be claimed for the use of gas in the domestic field. These were admirably summarized by Mr. Bishop in an Address he gave to the members of your parent Association in the Autumn of 1937. While, so far as coke is concerned, its extended use will not only lead to the more rapid evolution

of smokeless towns and cities, and thus provide an inestimable boon for us all, but the material is cleaner to use than coal.

At this time it is a little difficult to anticipate in detail the improvements which will be effected in the new designs of competitive apparatus to be made available shortly after the termination of hostilities. We can, however, obtain a broad picture by consideration of the present state of the art. It is to be anticipated that after the war those responsible for the designs of appliances, intended for use with gas, coke, coal, and electricity will provide equipment showing distinct advantages over the types hitherto available. So far as thermal efficiency is concerned, a consideration of the performance of existing apparatus does give quite a clear indication of the room for improvement in the future. The efficiency advantage inherent in the use of electricity, as compared with gas, will be narrowed down, and the electrician will find himself in an even more difficult position in justifying the use of his commodity in competition with the other fuels for provision of the heat services. Were the problem of the type of fuel to be used to be determined solely on national grounds—i.*e.*, on the basis of the coal employed in the production of the fuel, or even on a mere cost basis—there would be no case at all for the use of electricity.

In one of the reports submitted for the Symposium at the Annual Meeting of the Institution in 1942 I gave in summary form estimated daily costs of providing heat services for two types of family of four persons each. I shall refer to such costs in greater detail later, but it may be remarked here that with 4d. gas and ½d. electricity, the cost of the electric service was computed to be roughly twice that of the gas service, but there are some people who will be prepared to pay this difference.

During the last 30 years, the performance of the solid fuel appliance has lagged behind that of the gas appliance, this largely due to the fact that the provision of equipment was determined solely by price. The speculative builder, in many cases, seemed to buy his appliances in the cheapest market, with the result that little money could be made available profitably for research and development.

Of recent years it has been realized, not only by those concerned with the manufacture of such apparatus, but by all whose livelihood is dependent on the successful winning and using of coal for the domestic market, that better and more costly apparatus must be made available. There is such room for improvement in coal-burning equipment that in the future closer competition must be anticipated. It is realized by the interests concerned that public opinion will not continue to permit the polluting of the atmosphere by the use of smoke-producing fuels in the homes, and that equipment must be provided which will allow either of the smokeless burning of such fuels, or of the very considerable reduction in the amount of smoke which is evolved.

So far as the domestic grate is concerned, it is believed that progress is being made, and those engaged in such researches seem hopeful that they will reduce to negligible proportions the average smoke output of the domestic fire, using bituminous coal. By attention to the design of the open grate solid fuel fire higher efficiencies can be attained, and our experiments with coke show that, in the laboratory, the radiant efficiency can be increased by as much as 20%.

Before the war there was some improvement in the external design of the continuously-burning solid fuel stoves which were offered to the public. Stoves of this type, which are kept alight for 24 hours a day, and are, therefore, closed at night, may not appeal to everybody, but there is anticipated by their manufacturers a steady and growing demand for them, and they may have a big part to play in the provision of the space-heating service required in the post-war houses. In any case, it will be possible to increase the overall efficiency of the open coal or coke fire by making arrangements to provide both convected and radiant heat. Table I summarizes briefly the efficiencies which it is felt will be attained with apparatus which will be made available. It will be noticed that some of these efficiencies are high, and if there is borne in mind the difference in the prime cost of the fuels, gas and coke, it will be realized that in the poorer homes it may be difficult to justify the sole use of a gas-burning appliance for space heating. From the Gas Industry point of view, it is to be emphasized that with coke a higher efficiency is attained than with coke.

TABLE I.—Thermal Efficiencies of Solid Fuel Appliances.

I. *Open Fire. Radiant Heat only.*

Fuel.	Present. Bench. %	Present. Effective. %	Future, add, say, 20% Effective.
Bituminous coal	26–27	23	27½
Steam coal	26–29	24	29
Anthracite	26–30	25	30
Low temperature coke	27	24	29
Gas coke	32–35	28	33½

II. *Convector Type Open Fire.* Open fire with convector attachment or independent slow combustion stove with front doors to open.

Fuel.	Radiant heat %.	Convected heat %.	Effective efficiency %.
Bituminous coal	10–20	30–50	50–60
High temperature coke	15–25	35–60	60–75

III. *Closed Stove.* Permanently closed.

Fuel.	Radiant heat %.	Convected heat %.	Effective efficiency %.
Low temperature coke, Gas coke, Anthracite	10–15	65–70	80

[The position in regard to the gas-consuming apparatus was then summarized.] For background heating there are the flueless appliances which yield an overall efficiency of 90%, and before the war designs were available of a type which satisfied the most exacting technical demands that could be advanced in connection with that market. During the war period there has been throughout the country a decrease in the sulphur content of gas, and further improvement in that direction is to be anticipated. The supply of gas containing only a small amount of sulphur will do much to increase the popularity of flueless apparatus.

Hitherto the gas fire has been used principally to provide an intermittent service, because, even with 10d. gas, it was cheaper to use a gas fire for short periods, such as are required in dining rooms and bedrooms, than to use a solid fuel fire. For continuous use, gas fires of high radiant efficiency, which also provide convected heat, will be made available, or, alternatively, the existing type of gas fire employed in conjunction with the flueless heater provides a very efficient combination. The difficulty with the convector fire is not so much the design of an appliance to give a reasonable amount of convected heat when standing on the test bench, but to ensure that the required overall efficiency will be attained and maintained under the actual conditions of use, when the heater is fitted at the foot of a chimney. Special precautions have to be taken to see that the chimney pull will not lead to a considerable reduction in heating efficiency, either because an increased amount of cold air is drawn through the heated zone of the apparatus, or because there is created such a pull in the vicinity of the fireplace as will lead to the removal of the convected heat before it can influence the conditions in the room itself.

It would seem that for space heating, gas will find the competition of solid fuel more severe in the post-war period, and so far as the "industrial" family load is concerned, it is my belief that the Gas Industry will be wise to pay greater attention to the supply of coke, especially as this can be done in such a way as to create a demand not only for coke, but for gas to be used for long periods each day during the cold weather. For example, if background heating is provided in the living room from a coke-operated boiler in the kitchen, it should be possible to supply thermal energy to the room itself in the form of convected heat at 3¾d. per therm on the basis of pre-war prices. With gas at 6d. per therm, radiant heat plus some convected heat could be supplied from the gas fire at, say, 10d. per useful therm. If 70% of the energy came from the coke appliance and 30% from the gas fire, the total heating would cost less than 6d. per useful therm. The use of a self-contained coal-burning appliance with an overall efficiency of 40%, with coal supplied at 2d. a therm, would involve a cost of 5d. per therm for the heat transmitted to the room itself. The increased elasticity of the coke/gas combination would be more than worth while at the small difference in cost.

During the last year or so I have made many contacts with architects and others interested in post-war housing problems, and have endeavoured to impress upon them the advantage to be gained by a simple modification of fireplace design, a modification which in principle would involve a reversion to an older type. I suggest that the heating appliance should not be built in, but that the chimney recess should be left open, and that the heating appliance, be it intended to operate by coal, coke, or gas, should be designed as an entity which can stand alone within the recess. Heat which normally passes through the back of the fire and is then dissipated would be returned to the room as convected heat, while, by a suitable design of chimney recess, and the provision of an inverted bell construction at the top, the dirtying of the walls by the upward flow of hot air can be prevented. Further, it will be found that after the fire has been burning for a few hours, the whole of the back of the recess is warned, and provides a large radiating surface at a relatively low temperature, the system adding materially to the comfort conditions of the room itself. If the existing type of gas fire were use in the way I indicate, its effectiveness would be increased by some 25%.

The case for gas for cooking is well established, and the load should be retained. The competition from the electrically operated appliance will continue, but, as already indicated, I think that the gas position will be relatively better after the war. The competition which may be offered by the solid fuel appliance may be more serious, and the final decision may turn on the question of the facility with which representative types of apparatus can be operated. It is unlikely that the advocate of solid fuel will confine himself to an apparatus designed solely for cooking. An endeavour may be made to combine the water heating load and the cooking load. In general, with solid fuel, higher efficiencies are attained by the provision of more than one service, although, of course, with some loss of elasticity. We have already seen, in the case of the space-heating appliance, that much greater efficiency is attained when both a high temperature service, radiant heat, and a lower temperature service, convected heat, are provided. It may be anticipated, then, that the post-war solid fuel cooking appliance will combine a cooker and a water heater, and will be designed to operate for 24 hours daily. The quality of the cooking can be made to compare very favourably with the admittedly high standard of the modern gas cooker. The same type of thermostatic control cannot be provided, however, and the availability of the "Regulo" will do much to help in retaining the load for gas. I feel optimistic about the future of the gas cooker.

For water heating, solid fuel is used to a larger extent than either gas or electricity, and of recent years there has been considerable

development in the application of the coke boiler. In the post-war house plumbing will be simplified, and, no doubt, centralized. Care will be taken to ensure that the bathroom, and the points at which hot water will be required, shall be reasonably near to the source of supply. Flow and return pipes and hot-water cylinders will be insulated, and it should be possible, in the majority of cases, to make provision for background heating, both for downstairs and for the principal bedroom. The majority of households in the country should be able to afford such a service. Relatively large supplies of hot water can be obtained with quite a small daily outlay, and the average "industrial" family may take up to 300 gallons of hot water a week, equivalent to, say, 37,000 B.Th.U. at the tap per day.

[The cost of providing typical heat services, whether obtained from coke, gas, or electricity, was then summarized. (Publication No. 248, I.G.E. 1942.)]

From the point of view of the Gas Industry the water-heating load has much to commend it, and if it can be secured for gas alone, would provide a steady demand all the year round—a demand which would be spread throughout the day, especially if the low consumption type of storage appliance is installed. It seems likely, however, that for the most part the larger section of the community will use solid fuel, certainly during the colder months of the year, and for this coke is the fuel, but in addition the Gas Industry should obtain a large proportion of the summer hot-water load if the case for gas is appreciated and made known to the public.

Small circulators, which can be used as adjuncts to the household circulating system, are, or will be, available in the post-war period. If these are designed with due consideration to the maintenance problems involved, their introduction should prove a distinct asset to the gas undertaking.

Whether the demand be for the storage or instantaneous heater, or both, the Industry can reasonably insist that even if the appliances available after the war do not show any increase in thermal efficiency, they will be of such improved type as to simplify very materially the hot-water problems. As the prime cost of gas per therm is more than that of the solid fuels, it is essential to ensure that the hot-water service which can be obtained will compare favourably with that made available by the alternative systems. A gas-operated storage heater gives a service better than that supplied by the solid fuel appliance, this owing to the facility with which the fuel can be handled, and in addition to the incorporation of thermostatic control.

Where instantaneous appliances are used, it is important to see that their rating is such that they will give a rapid hot-water service. To use for the preparation of bath water instantaneous heaters burning only 60–80 cu.ft./hr. does a disservice to the reputation of gas as a fuel for the provision of hot water.

The electrical industry has attained considerable success with the immersion heater. In general, these appliances are not rated at more than 2–3 units, and, even assuming they show a high efficiency, the cost of obtaining hot water is excessive. They are used for the most part for topping up, and the consumer does not realize what a relatively poor service is being obtained for the money expended. It is claimed that by the end of 1938 there were over ½ million electrically-operated water heaters in use, and in many of our big centres the sale of the electrical appliance seems to be pushed with much greater energy and effect than the sale of the gas appliance. If gas is used for the summer load for hot water, and for the space-heating loads for the cold months, the combination will aid in the provision of a reasonably good load factor.

We may take it that immediately after the war the solid fuel industry will continue to be directly responsible for the major domestic fuel needs of the community. Nevertheless, I anticipate that by degrees the direct use of coal will be replaced by coke and/or gas. This will be to the advantage of the nation as a whole, and I hope the change-over will be gradually effected not only by agreement with, but also by the direct help of, the solid fuel industry. If the control of monopolies, of which we have heard so much of late from professional politicians, is to lead to anything of real value to the country, it must produce co-operative effort of this type. I would, however, interpolate here the remark that human nature will always assert itself. To-day there is in Russia no Communism as formerly understood. Each individual is paid according to his deserts. It is merely providing a soporific to talk of the Ministry of Fuel as though it were in charge of a fairy who will wave a wand and define the part to be played by the various fuels in the domestic field. The subject is one which could be made intensely interesting for a debating society, but let us face the future with a sense of reality. We must have competition to keep us alive and effective, and we ought really to give thanks for the existence of competitive interests of sufficient intelligence and energy to keep us on our toes. At the end of his Address on Sunday, March 21, the Prime Minister advised us to keep our eye on the ball, and if we do that, the Gas Industry and Coke Industry should romp ahead—an easy winner—in the domestic field. The electrical people are losing no time in staking their claims for the use of electricity. As an individualist I welcome their competition. I feel we, the Gas Industry, owe more to the electrical industry than is generally appreciated. Had it not come into existence as a competitor, we should not have developed as rapidly as we have done during the last 40 years. If you have any doubts as to the ambitions of the electrical industry I would advise you to study the booklet which describes the E.A.W. point of view on post-war reconstruction—a really great propaganda effort, against which the Gas Industry has nothing to put at the present moment, although their case is immeasurably stronger than that of the electrical industry. The Ministry of Fuel dare not ignore the voting strength of the electrical industry, or of the coal industry, and one need expect nothing drastic from the professional politicians.

The Gas Industry must, however, make up its mind what it is going to do. It is no good pressing for new types of apparatus until it has been decided what services it is intended to offer the consumers Our Industry has a great future if we tackle the problems energetically, but if we decide to stand still, for fear it might not be economic to undertake this or that type of load, then our position will become unfavourable and we shall slide downhill. I hope in the discussion you will indicate something of what you intend to do. The Gas Appliance Industry is a highly competitive one, and its members have to be reasonably efficient to exist. You do not manufacture products which are in competition with one another, but continued development will depend on the showing the Gas Industry can make in competition with the coal industry and with the electrical industry, and I hope you will use every endeavour to take full advantage of the potentialities of the carbonizing process.

If it becomes a general practice to supply town gas so as to allow of a low commodity charge, then there should be a considerable extension of the use of the fuel throughout the country. I hope, however, the Gas Industry will not forget that it supplies coke and gas.

(Our report of the discussion will be published next week.)

The Bradford Corporation Gas and Electricity Departments recently co-operated in staging a Fuel Economy Exhibition in collaboration with the Education Department's drive for the "Make Do and Mend" Campaign. The Exhibition was opened by H.R.H. The Princess Royal, and was visited by 4,000–5,000 persons during the four days it was open to the public. The gas and electricity stand was a joint effort and our photograph shows the layout arrangement. The table on the right-hand side carried weapons of war—shells, trench mortar bombs, smoke flares—together with a glass-cased gas meter, large card reproductions of gas and electricity meter indices. The table on the left-hand side exhibited lagged storage cylinders, cut-out cards of waste from dripping water taps, and emphasized the 5-in. water level in baths. The centre piece carried gas and electric cookers, with solid fuel fire, and large cards gave the usual "Do's and Don'ts" in connexion with fuel economy.

Demonstrations of the preparation of wartime recipes were held at three sessions daily and attracted a very large public. The demonstrators were kept busy answering queries between the demonstrations, and the whole effort was considered eminently satisfactory.

War work, female labour, and man-power shortage have ruled out most of the older fashioned methods of lifting and shifting in industry, and rendered increasingly necessary the installation of equipment that will do the job quickly, reliably, and without fatigue. With no greater physical strain than the depression of finger-tip push buttons, any load from 5 cwt. to 10 tons can now be lifted and conveyed by means of the King electric chain pulley block, the many exclusive features of which ensure safety, long life, and satisfactory service. Made in three models, the equipment has a range of lifting speed from 10 to 30 ft. per minute and a traverse speed from 60 to 90 ft. per minute up to five tons; beyond that weight the blocks are built specially to requirements. The makers are Geo. W. King, Ltd., Hitchin, Herts, who inform us that they will welcome enquiries and will be pleased to advise on any particular lifting and conveying problems.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

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Gas Cooker Ovens

Among recent patents is one (No. 545,873; application date, Dec. 16, 1940) taken out by Cannon Iron Foundries, Ltd., R. T. Clayton, and A. F. Oatley.

It relates to the heating of gas cooker ovens. The burner is arranged so that its flames are directed into a combustion chamber which is arranged in, and is bodily removable from, the bottom angle formed between the rear or side wall and the bottom of the oven, the combustion chamber being isolated from metallic contact with the oven walls and base. The outlet from the combustion chamber is at the upper end and the burner is preferably at the bottom of the chamber, which is open for the intake of air. The rear or outermost wall of the combustion chamber is vaulted forwardly, over the chamber and the outlet opening, and this roof acts as a shield to protect the back wall of the oven, and as a reflector to direct the hot products of combustion into the oven. The burner is preferably a luminous flame burner.

Fig. 1 is a broken perspective view looking into the oven.

The top of the oven is suitably lagged; *c* is a front frame; *e* is a lining plate of a side wall which has a small return flange *f* on the front; *g* represents ribs on the side walls for supporting shelves and trays in the usual way; *h* is the lining plate of the back wall which finishes in a flange at *i* where the flue and combustion chamber are arranged across the back wall; *j* is the lagging and *k* the casting of the back wall. The bottom plate *m* of the oven is shown as a pressed metal spillover tray which slides on the lowermost ribs *g* on the side walls below the bottom cross bar *n* of the front frame; but it may be arranged above the bar *n* if desired.

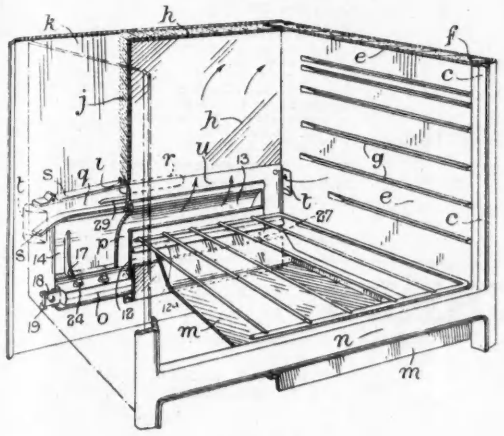

FIG. 1.

The burner is referred to by the letter *o*; the combustion chamber by *p*; and the outlet flue chamber by *q*. Just below the flange *i* of the back wall lining plate *h* the back wall casting has a rear flue outlet nozzle *r* and two separated, forwardly projecting ribs *s* which form the top and bottom walls of the transverse outlet flue chamber *q* from which the nozzle *r* leads. The ribs *s* incline downwardly slightly toward the sides of the oven to bring the flue chamber at each end into communication with the oven interior by means of the semi-cylindrical recesses *t* in the side walls.

The front of this flue chamber *q* is formed by a plate *u* which is secured by screws from the back of the oven. The plate *u* has two vertical pillars at the ends and into the space between them the combustion chamber *p* is fitted.

The combustion chamber consists of a rear wall, say about 12 or 13 in. in length, the upper part of which is forwardly curved and finishes in a bead or lip with a straight rear edge. This rear wall is preferably cast integral with two return or end walls, each of which is provided with two or more embossments along its inner edge so as to form thicker parts which can be internally screw threaded to receive attachment screws for a separately cast front wall 12. The front wall 12 is of less height than the back wall and is spaced, say, 1 in. to 1½ in. below the vaulted upper part of the back wall, and this space forms an outlet opening 13 from the combustion chamber. This combustion chamber is arranged in but is out of actual contact with the back wall *k* of the oven, which is preferably cast with a downwardly and outwardly curving skirting 14 which approximately conforms with the curved upper part of the back wall of the combustion chamber, but it is spaced away therefrom, so as to leave an insulating air space between the two, but this air space has no connexion with the outlet flue chamber *q* above. Immediately above this curved skirting part on the vertical oven wall the surround plate *u* is formed, which is really a part of the back wall of the oven, with a shoulder which extends along the wall horizontally, directly above but spaced from the upper lip of the combustion chamber. This spaced shoulder and the lip of the combustion chamber prevents any condensation, or any fatty or other substances from the wall above entering the combustion chamber.

The front wall 12 of the combustion chamber stands up well above the rear edge of the bottom plate or tray *m* of the oven and preferably has a lip 12*a* overhanging the rear edge of the bottom plate. The combustion chamber may be located in position by notches in the edge of its rear wall. The burner may be secured by means of lugs 18 at the ends fitting against seating blocks 19 on the back wall casting. Gas is burnt at the nozzles 24, which are slightly inclined forwardly so as to direct the flames toward the top of the front wall 12.

The combustion chamber can be bodily rocked forwardly from the inside of the oven and removed for cleaning and other purposes and as readily pushed back again into place. When it is in place the combustion chamber, except for these small points of contact, is isolated from the remainder of the back of the oven and practically no heat transference by conduction can take place. With this arrangement of the combustion chamber and the luminous flame burner with its nozzles right at the bottom of the chamber, thorough combustion of the gas takes place in the incoming air within the chamber and the hot products of combustion are forwardly and slightly upwardly directed into the oven chamber, practically filling the rear part thereof, and tend to fall and divide after passing around the front of the oven to the outlets from the oven formed by the recesses *t* and so into the outlet flue chamber. The patentees state that uniformity of temperature over the whole width of the oven is obtained and a high efficiency and satisfactory working conditions result. A supply for a liquid thermostatic tube can be provided; and this tube can be arranged along the transverse outlet flue chamber.

Separation of Particles from Gas

W. C. Holmes & Co., Ltd., and D. M. Henshaw have been granted a patent (No. 546,790) concerned with apparatus for the separation of suspended particles from gas. It relates to apparatus in which there is provided within a chamber a rotor in the form of a cage or drum having blades or vanes on its periphery. The blades are normally inclined with respect to its periphery, in association with means for causing the gas to travel from the chamber into the interior of the cage, thereafter to be withdrawn in an axial direction. Hitherto, state the patentees, the cages of such apparatus have been formed by securing to end members a plurality of independent slats or narrow strips, these slats being in some cases pivotally connected with the end members and in others rigidly secured thereto. The object of the invention is to provide a simplified and cheaper construction.

The invention consists, broadly, in apparatus in which the peripheral walls of the drum are formed by bending into cylindrical form a metal sheet or plate which, by cutting and pressing, has been given a louvred formation. At intervals in the width of the sheet or plate the louvred formation is interrupted to provide, when the sheet or plate is bent into a generally cylindrical form, cylindrical portions in which are engaged rings functioning as reinforcements in preventing distortion. The rings will normally be secured to the plate by welding, and they will in effect form reinforcements of T-section with the adjacent material of metal plate or sheet.

The invention extends to apparatus adapted to be used as fans, blowers, and exhausters comprising rotors, and to apparatus for the treatment of gases for the separation of particles of solid or liquid material comprising rotors of the construction defined. In the former case the rotor may be located between and coaxially with impellers of other form designed to cause the gases to travel from the interior of the rotor in an outward direction. In the latter case such a rotor may be secured to or associated with a fan rotor so that the gases are caused to pass by the suction of the fan from the exterior of the rotor into it and thence in an axial direction to an outlet, the rotor in this case operating to effect the separation of suspended particles by centrifugal action. The chamber in which it is located may form part of the casing of a mill as claimed in Specification No. 538,847, or it may be part of an apparatus designed to be secured in an appropriate position with respect to some other apparatus, the operation of which results in the production of gas containing suspended solid or liquid particles.

Society of British Gas Industries

The Society has awarded the following Silver Medals to the Authors of Papers to Junior Associations:

London and Southern District to L. W. Andrew for Paper "No Complaints from the District."

Manchester and District to H. N. Dann for Paper "The Gas Industry in the Post-War World."

Midland to N. Bedingfield for Paper "Producer Gas as an Emergency Substitute for Town Gas."

Scottish (*Eastern District*) to T. R. Sawers for Paper "Planning."

Scottish (*Western District*) to David L. Dickson for Paper "Future Policy in Relation to Gas-Works Practice."

Wales and Monmouthshire to W. J. Viney for Paper "Deterioration of Gas Appliances due to Sulphur Content in Gas."

Gas Products Prices

The London Market May 10.

All Coal Tar Products are in good demand, and Pitch in the London area remains about 45s.

The Provinces May 10.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Naphtha and Xylol controlled by the Coal Tar, Naphtha, and Xylol Order, 1942, dated Dec. 7, 1942, and operative from Dec. 21. Carbolic acid, 60's, naphthalene, and anthracene controlled by the Coal Tar Products Prices Order S. R. & O. 2509, dated Dec. 7, 1942, and operative from Jan. 1, 1943. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5½d.; timber preservation and other purposes 4¾d. to 6d.

* In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland May 8.

Throughput is well maintained. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6½d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6d. to 6½d.; hydrogenation oil, 5⅞d. per gallon; all *ex* Works in bulk. Refined cresylic acid is in great demand at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6½d. to 7d. per gallon. Solvent naphtha: Basic prices delivered in bulk, 90/160 grade 2s. 8d., and 90/190 Heavy naphtha, Unrectified, 1s. 10½d. Rectified, 2s. 3d. per gallon. Pyridine: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

Gas Stocks and Shares

There was little apparent increase in activity in stock markets last week. Industrial equities were in fair demand and iron and steel shares received more attention. On the whole markets were firm on the Tunisian news, the best of which came too late to note the effect on quotations, although the tone was somewhat dull at the close.

The volume of business in gas stocks and shares continued on a comparatively small scale, but prices remained very firm while all movements were in an upward direction. Gas Light units commenced to improve again, closing 6d. higher at 17s., and several corporation stocks also hardened. Interest in Primitiva holdings led to gains; Oriental and Uxbridge ordinaries were also good features. In the Supplementary List it only requires a parcel of stock to change hands, or an enquiry, to bring about a sharp rise in price—Cheltenham 4% debenture and North Middlesex 5% preference thus benefiting last week.

The following changes in price occurred during the week:

OFFICIAL LIST		
Bournemouth max. Div.	138—143	+1
British Ord.	103—108	+1
Gas Light Units	16/6—17/6	+-/6d
Ditto 3½ p.c. Red. Pref.	91—96	+1
Montevideo Ord. (x.d.)	95 – 100	May 3
Oriental	105—110	+3
Primitiva Holdings Ord.	13/—15/-	+-/6d
Ditto 6 p.c. Red. Cum. Pref.	100—105	+4
Severn Valley Ord.	20/—21/-	+1/-
Ditto 4½ p.c. Cum. Pref.	18/6—20/6	+-/6d
South-Eastern Gas Corporation Ord.	18/3—19/3	+-/3d
South Suburban 4 p.c. Pref.	88—93	+3
United Kingdom Gas Corporation 4½ p.c. 1st Cum. Pref.	19/—20/-	+-/6d
Uxbridge Ord.	118—123	+5
SUPPLEMENTARY LIST		
Cheltenham 4 p.c. Deb.	103—108	+8
North Middlesex 5 p.c. Pref.	100—105	+5
PROVINCIAL EXCHANGE		
Bristol	113—115	+1

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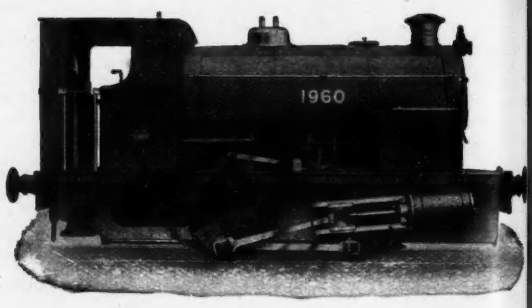
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